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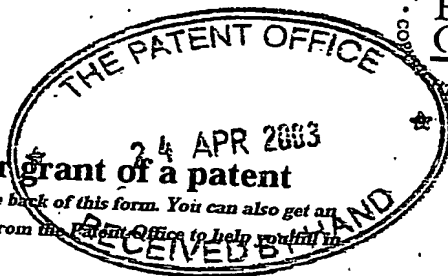
6 April 2004

Patents Form 1/77

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1/77



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1. Your reference

P17383GB-NHF/SJP/mm

25APR03 E802421-7 000.889

P01/7700 0.00-0309306.9

2. Patent application number

(The Patent Office will fill in this part)

0309306.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)

AUTOLIV DEVELOPMENT AB
S-447 83 Vargarda
SWEDEN

Patents ADP number (if you know it)

321018009

If the applicant is a corporate body, give the country/state of its incorporation

SWEDEN

4. Title of the invention

IMPROVEMENTS IN OR RELATING TO A METHOD OF PACKAGING AN AIR-BAG

5. Name of your agent (if you have one)

Forrester Ketley & Co.

"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)

Forrester House
52 Bounds Green Road
London
N11 2EY

Patents ADP number (if you know it)

133001 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number

Country

Priority application number
(if you know it)

Date of filing
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application

Number of earlier application

Date of filing
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:

YES

- a) any applicant named in part 3 is not an inventor, or
 - b) there is an inventor who is not named as an applicant, or
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- See note (d))

Patents Form 1/77

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Description	7
Claim(s)	2
Abstract	1
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Priority documents

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*)

THREE

Request for preliminary examination and search (*Patents Form 9/77*)

ONE

Request for substantive examination (*Patents Form 10/77*)

Any other documents
(*please specify*)

11. I/We request the grant of a patent on the basis of this application.

Signature
Forrester Ketley & Co.
Forrester Ketley & Co.

Date
24 April 2003

12. Name and daytime telephone number of person to contact in the United Kingdom

S.J. PARRY
(020) 8889 6622

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PATENTS ACT 1977

P17383GB - NHF/SJP/ns

5 DESCRIPTION OF INVENTION

“IMPROVEMENTS IN OR RELATING TO A METHOD OF
PACKAGING AN AIR-BAG”

10

THE PRESENT INVENTION relates to method of packaging an air-bag and more particularly relates to a method of packaging an air-bag such as an inflatable curtain.

15

It has been proposed to provide an air-bag in a motor vehicle in the form of an inflatable curtain. The air-bag is initially stored in the roof lining of the motor vehicle above the door openings and, in the event that an accident should occur, is inflated to form a curtain which extends between the head of a vehicle passenger and the adjacent window. Many vehicles are provided with inflatable curtain air-bags of this type.

20

It has been proposed to package an inflatable curtain of this general type, either by rolling the air-bag to form a generally cylindrical roll and then inserting the roll into an appropriate package or, alternatively, to fold the air-bag using, for example, zig-zag folds and then providing a package for the folded air-bag. The resultant packages tend to be either cylindrical or substantially rectangular. It is often difficult to provide sufficient space within the roof lining of a motor vehicle to receive a package of this particular format.

25

The present invention seeks to provide an improved method of packaging an air-bag.

5 Accordingly, the present invention provides a method of packaging an air-bag, the method comprising the steps of folding the air-bag into a roll, deforming the roll such that at least a region of the roll has a substantially "C" shape, and packaging the deformed roll.

10 Preferably, the roll is deformed so as to have a plurality of substantially "C" shaped regions.

Advantageously, the roll is deformed by urging a member into contact with the exterior of the roll.

15 Conveniently, the roll is deformed by a plurality of said members.

Advantageously, the member urged into contact with the exterior of the roll is a rod or axle.

20 Conveniently, the roll is introduced to said package together with the or each said rod or axle and the or each rod or axle is subsequently withdrawn from the package.

25 Preferably, the or each member urged into contact with the roll is a plate, there being a substantially "U" shaped form to receive the roll.

Advantageously, the or each plate is removed from the combination of the deformed roll and the form, the combination of the deformed roll and the

form is introduced to a package, and finally the "U" shaped form is withdrawn from the package.

5 The present invention also provides an air-bag whenever packaged by a method as set out above.

10 In order that the invention may be more readily understood, and so that further features thereof may be appreciated, embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a diagrammatic view illustrating a first stage in the packaging of an air-bag;

15 FIGURE 2 illustrates a subsequent stage;

FIGURE 3 illustrates a further stage;

20 FIGURE 4 illustrates a final stage;

FIGURE 5 illustrates the first stage of an alternate method of packaging an air-bag;

25 FIGURE 6 illustrates a subsequent stage;

FIGURE 7 illustrates a further stage;

FIGURE 8 illustrates a final stage;

FIGURE 9 is a diagrammatic view illustrating a modified method of packaging an air-bag;

5 FIGURE 10 illustrates a subsequent stage;

FIGURE 11 illustrates a further stage;

FIGURE 12 illustrates a final stage; and

10

FIGURE 13 illustrates an alternative form of air-bag produced by the method of the present invention.

15 The methods of packaging an air-bag which will be described below seek to achieve a package which is of generally oval form, thus facilitating the location of the package within the roof lining of a motor vehicle.

20 Considering initially Figures 1 to 4, a method of packaging an air-bag will be described in which the air-bag is rolled and then formed so that at least a region of the air-bag has a generally "C" shape, thus providing an enhanced package.

25 Figure 1 illustrates diagrammatically an air-bag 1 which has been rolled to have a cylindrical form, such that only part of the air-bag in form of mounting lugs 2 extends from the roll. A sheet-like wrapper 3 is illustrated in which the rolled air-bag is to be packaged. Shown adjacent the air-bag is a rigid rod or axle 4.

Figure 2 illustrates the rod or axle 4 being moved forcibly towards the centre of the roll 1. The outer part of the roll 1 may be prevented from movement by an appropriately shaped housing or retainer element, but the effect of the rod or axle 4 is to deform the roll 1 from its initial cylindrical shape, as shown in Figure 1, to have a substantially "C" shape as shown in Figure 2.

Figure 3 shows the wrapper 3 being moved upwardly, as indicated by arrows 5,6 on either side of the combination of the "C" shaped roll 1 and the rod or axle 4, to form a package. The rod or axle 4 is then removed from the package, and the wrapping 3 is secured together in the region 7 to form a complete package. It is to be observed that the complete package is of generally oval form.

It is envisaged that an air-bag which, when rolled in the form of a roll as shown in Figure 1 so as to have an outer diameter of 4 cm may, by the described technique, be presented in a generally oval package having a maximum dimension in the range of 4-5 cm and a minimum dimension in the range of 2-2.5 cm. Such a package may be more easily retained within a roof lining of a motor vehicle.

Figures 5 to 8 illustrate an alternative method of packaging an air-bag, also in accordance with the invention. Referring initially to Figure 5, a rolled air-bag 10, equivalent to the air-bag 1 of Figure 1, is illustrated. Also shown is a "U" shaped form 11 and a deforming plate 12 located above the rolled air-bag. The air-bag 10 is located on top of the form 11, and the deforming plate 12, as shown in Figure 6, is moved forcibly downwardly in alignment with the centre line of the form 11. The end result is that the roll 10 is forced into the form 11, with the roll having one part on one side of the plate 12 and another

part on the other side of the plate 12. The roll thus adopts a generally "C" shaped configuration within the "U" shaped form 11. Subsequently, as shown in Figure 7, the plate 12 is removed and a wrapper or packaging 13 may be passed around the combination of the roll 10 and the form 11. Finally the form 11 is removed from the package and the package 13 is sealed as shown in Figure 8.

It is to be appreciated that in both of the methods described above the final package consists of a roll which has been deformed to be of "C" shape contained within a package.

However, it is also envisaged that variants of the methods described above could be used to produce a final air-bag package in which the rolled air-bag is deformed so as to have a plurality of substantially "C" shaped regions. In this regard, reference will now be made to Figure 9 to 12.

Referring initially to Figure 9, a rolled air-bag 20, equivalent to the air-bag 1 of Figure 1, is illustrated. The air-bag 20 has been rolled so as to have a generally cylindrical form, such that only part of the air-bag in the form of mounting lugs 21 extends from the roll 20. A sheet like wrapper 22 is again illustrated, in which the rolled air-bag is to be packaged. Showing adjacent the air-bag 20, on opposite sides of the air-bag are two rigid rods or axles 23, 24. The two rods or axles 23, 24 are offset from one another, such that the first rod or axle 23 is located nearer to the wrapper 22 than the second rod or axle 24.

25

Figure 10 illustrates the two rod or axles 23, 24 having been moved forcibly towards one another as to deform the roll 20. It will therefore be seen that the effect of the two rods or axles 23, 24 is to deform the roll 1 from its initial cylindrical shape, as shown in Figure 9, so as to have a substantially

serpentine or "S" shape as shown in Figure 10. In fact, it will be seen that the deformed roll actually has a pair of opposed "C" shaped regions, each "C" shaped region being formed by a respective rod or axle 23, 24.

5 Figure 11 shows the wrapper 22 being moved upwardly, as indicated by arrows 25, 26 on either side of the combination of the shaped roll 20 and the rod or axles 23, 24, to form a package in substantially the same way as described above in connection with Figure 3. The rod or axles 23, 24 are then both removed from the package and the wrapping 22 is secured together in the
10 region 27 to form a complete package. It is to be observed that the complete package again has a generally oval form.

It should be appreciated that the method described above in connection with Figures 9 to 12 could be modified so as to form a completed air-bag
15 package in which the roll 20 has more than two substantially "C" shaped regions. For example, Figure 13 illustrates an alternative package in which the roll 20 has three opposed substantially "C" shaped regions. This type of package can simply be formed by a variation of the method described above in connection with Figures 9 to 12, but using three rods or axles 23, 24.

20

In the present specification "comprises" means "includes or consists of" and "comprising" means "including or consisting of".

The features disclosed in the foregoing description, or the following
25 claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately, or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS:

5

1. A method of packaging an air-bag, the method comprising the steps of folding the air-bag into a roll, deforming the roll such that at least a region of the roll has a substantially "C" shape, and packaging the deformed roll in a package.

10

2. A method according to Claim 1, wherein the roll is deformed so as to have a plurality of substantially "C" shaped regions.

15

3. A method according to Claim 1 or 2, wherein the roll is deformed by urging a member into contact with the exterior of the roll.

4. A method according to Claim 3 as dependent upon Claim 2, wherein the roll is deformed by a plurality of said members.

20

5. A method according to Claim 4, wherein the or each member urged into contact with the exterior of the roll is a rod or axle.

25

6. A method according to Claim 3, wherein the roll is introduced to said package together with the or each said rod or axle and the or each rod or axle is subsequently withdrawn from the package.

7. A method according to any one of Claims 1 to 4, wherein the or each member urged into contact with the roll is a plate, there being a substantially "U" shaped form to receive the roll.

8. A method according to Claim 7, wherein the or each plate is removed from the combination of the deformed roll and the form, the combination of the deformed roll and the form is introduced to a package, and finally the "U" shaped form is withdrawn from the package.

9. An air-bag whenever packaged by a method according to any one of the preceding Claims.

10. A method of packing an air-bag substantially as herein described with reference to and as shown in Figures 1 to 4 of the accompanying drawings.

11. A method of packing an air-bag substantially as herein described with reference to and as shown in Figures 5 to 8 of the accompanying drawings.

12. A method of packing an air-bag substantially as herein described with reference to and as shown in Figure 9 to 12 of the accompanying drawings.

13. A method of packing an air-bag substantially as herein described with reference to and as shown in Figure 9 to 12, modified as described with reference to Figure 13 of the accompanying drawings.

14. Any novel feature or combination of features disclosed herein.

ABSTRACT

5

**"IMPROVEMENTS IN OR RELATING TO A METHOD OF
PACKAGING AN AIR-BAG"**

10

There is disclosed a method of packaging an air-bag. The method comprises the steps of folding the air-bag into a roll (1,10), deforming the roll (1,10) to have at least a region having a substantially "C" shape, and packaging the deformed roll (1,10). The roll (1,10) is preferably deformed by urging a
15 member (4, 12) into contact with the exterior of the roll (1,10). This member can be a rod or axle (4), or a plate (12).

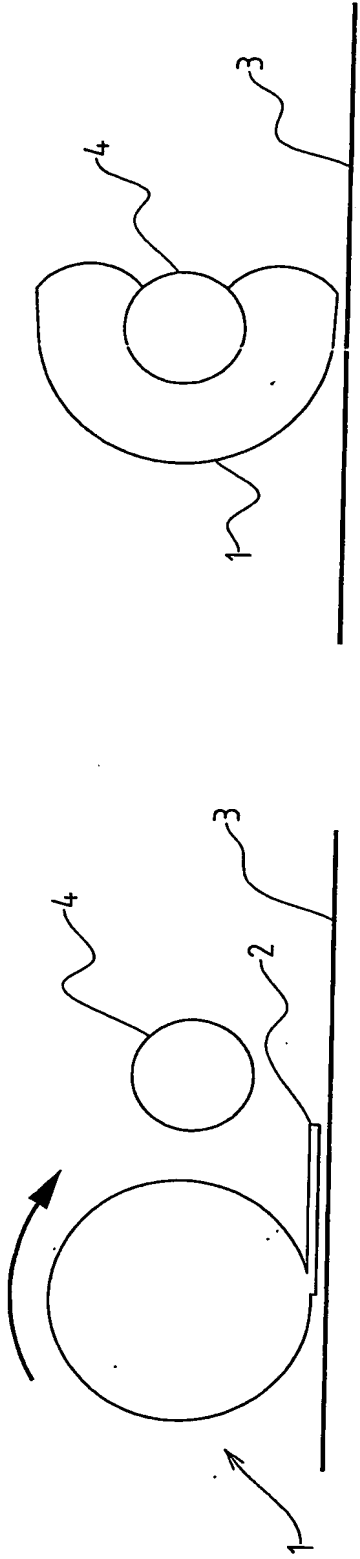


FIG 2

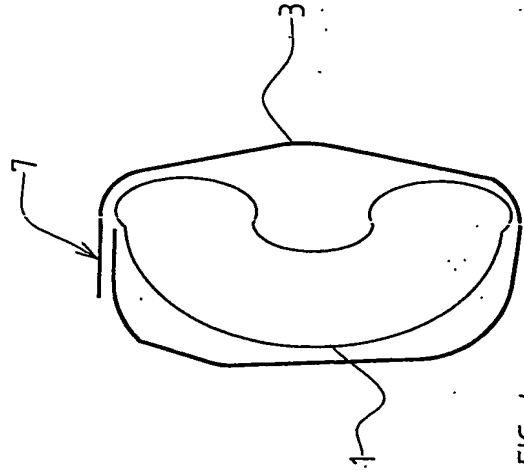
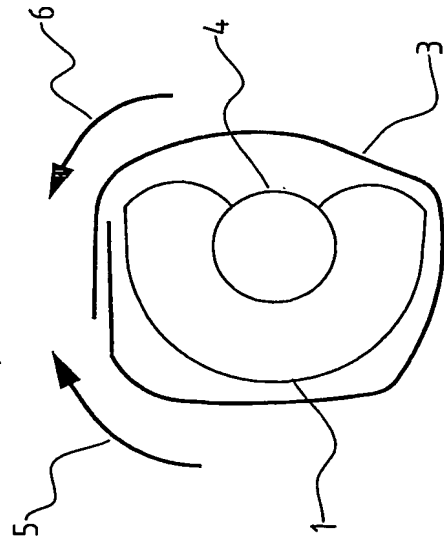


FIG 4



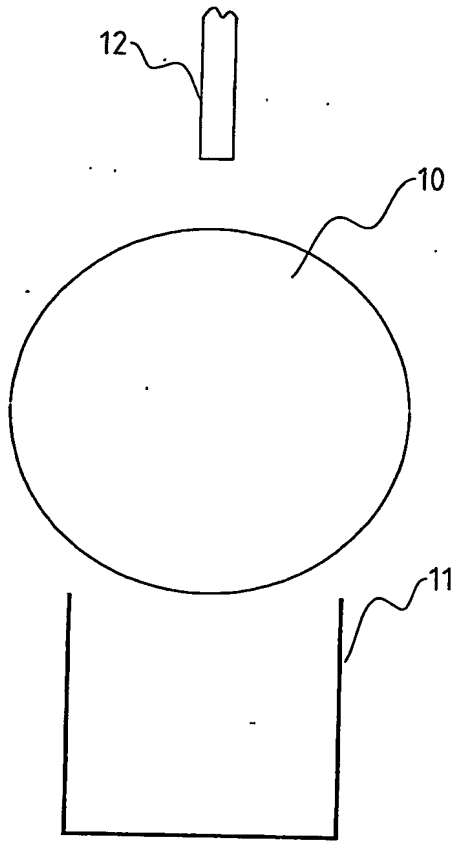


FIG 5

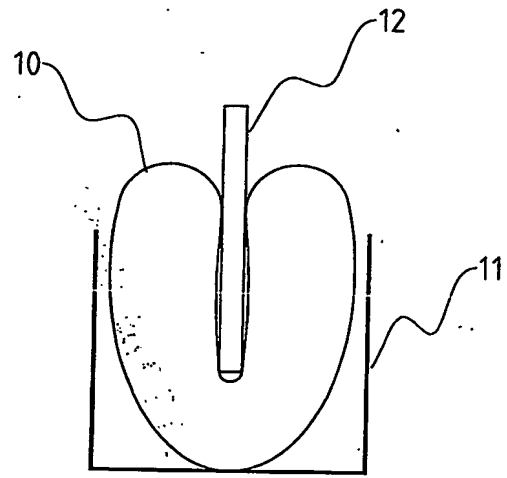


FIG 6

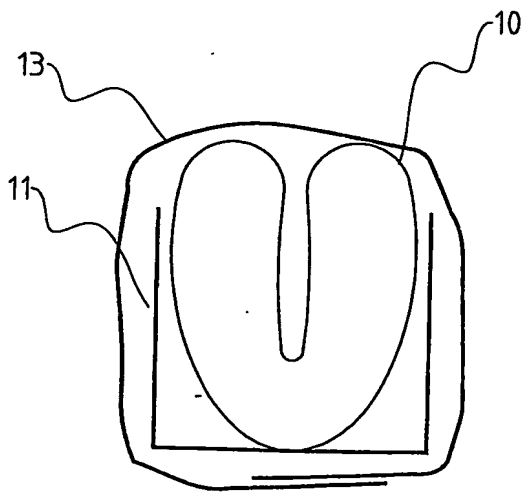


FIG 7

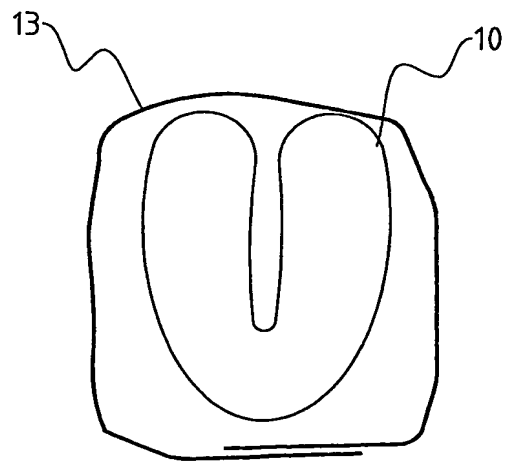


FIG 8

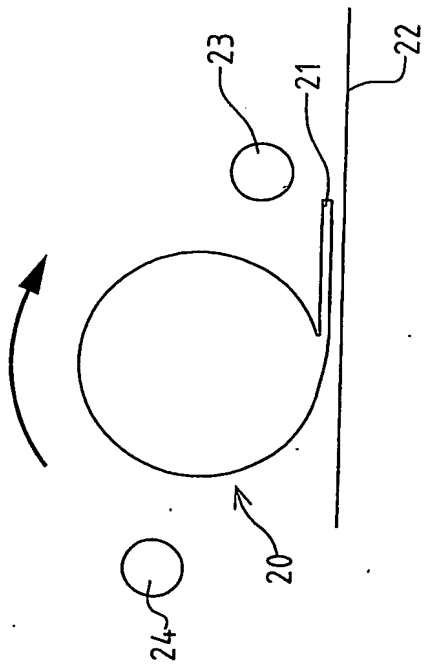


FIG 9

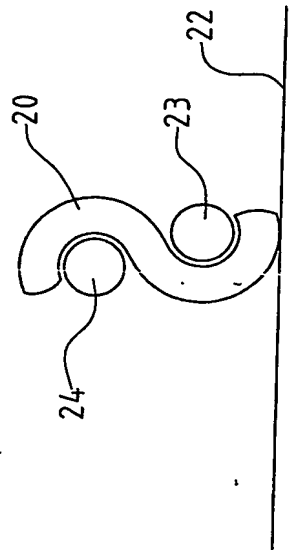


FIG 10

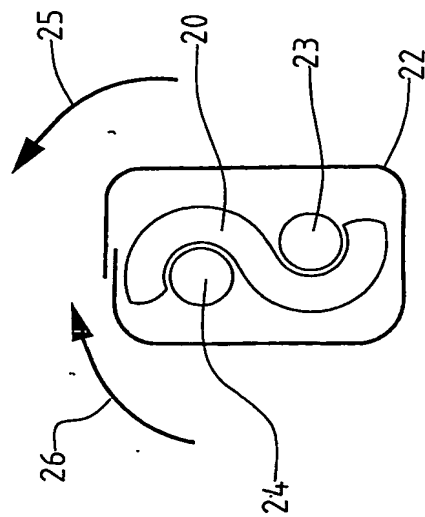


FIG 11

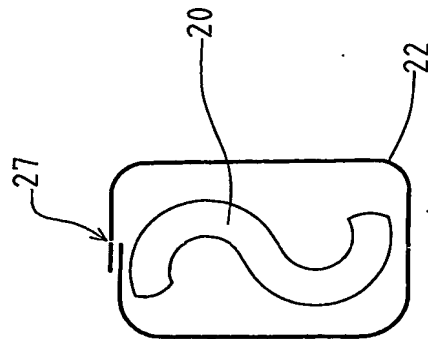


FIG 12

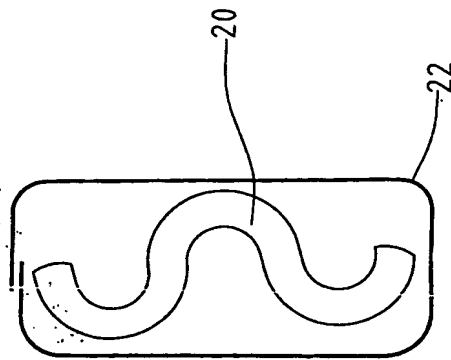


FIG 13

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